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Static Splay-Stripes in a Hybrid Aligned Nematic Layer

Authors: Amelia Sparavigna [a]; Lachezar Komitov [b]; Bengt Stebler [b]; Alfredo Strigazzi [a]

Affiliations: [a] Dipartimento di Fisica, Politecnico di Torino, CISM and INFM, Unità di Torino, Torino, Italy
[b] Department of Physics, Chalmers University of Technology, Göteborg, Sweden

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Abstract

A usual aperiodic hybrid alignment can appear in a nematic layer with weak anchoring only if the cell thickness is greater than a critical value d_h, below which a static periodic pattern instead of the hybrid aperiodic structure could be preferred, if the energy cost for a three dimensional deformation, involving twist, is less than the cost for the two-dimensional deformation of splay-bend type. We have studied the occurrence of the mechanical instability leading to the static periodic splay-stripes, i. e. in the case of the tilt anchoring stronger at the one of the walls, in which the anchoring is planar, for several values of the twist anchoring strengths. Here the behavior of the threshold d for the periodic stripes is presented and discussed as a function of the anchoring energies and of the ratio of nematic bulk elastic constants, in the frame of the usual continuum theory.